

WHAT IS CLAIMED IS:

1. A method for selectively removing portions of an etchable material comprising the steps of:
 forming a layer of polyimide on the etchable material;

 patterning said layer of polyimide to expose portions of the etchable material;

 etching the etchable material using vapor hydrogen fluoride in accordance with a pattern defined by said layer of polyimide; and

 removing said layer of polyimide.

2. The method of claim 1 wherein said patterning step comprises the steps of:

 forming a layer of photoresist over said

 layer of polyimide;

 selectively exposing said layer of

 photoresist;

 removing portions of said layers of

 photoresist and polyimide to define said pattern; and

 stripping said layer of photoresist.

3. The method of claim 1 wherein said patterning step comprises the steps of:

 selectively exposing said layer of

 polyimide; and

 developing said layer of polyimide to define said pattern.

4. The method of claim 2 wherein said step of removing said layer of polyimide comprises the step of subjecting said layer of polyimide to QZ 3321 polyimide stripper.

5. The method of claim 2 wherein said etching step includes the use of N₂ gas and vapor H₂O.

6. The method of claim 5 wherein said etching step uses a quantity ratio of said N₂ gas to vapor H₂O to

vapor hydrogen fluo of approximately 150 to 20 to 7, respectively.

7. The method of claim 6 wherein said etchable material is etched to a depth of greater than 4000 angstroms.

8. The method of claim 7 wherein said etchable material is etched to a depth of approximately 8000 angstroms.

9. A mask for vapor hydrogen fluoride etching, said mask comprising a layer of patterned polyimide.

10. The mask of claim 9 wherein said polyimide is non-photosensitive.

11. The mask of claim 9 wherein said polyimide is photosensitive.

12. The mask of claim 10 wherein said polyimide comprises DUPONT PI-1111.

13. A method for selectively removing portions of an etchable material comprising the steps of:
cleaning the etchable material;
forming a layer of polyimide over the etchable material;

forming a layer of photoresist over said layer of polyimide;

patternning said layer of photoresist;
patternning said layer of polyimide in accordance with said layer of patterned photoresist; and exposing said layer of polyimide to vapor hydrogen fluoride etching.

14. The method of claim 13 wherein said forming step comprises spin coating said layer of polyimide over the etchable material at a spin speed of at least 2300 rpm.

15. The method of claim 14 wherein said exposing step has a duration of less than about 20 seconds.

16. A method for selectively removing portions of an etchable material comprising the steps of:

forming a layer of polyimide on the etchable material;

patterning said layer of polyimide to expose portions of the etchable material;

etching the etchable material in accordance with a pattern defined by said layer of polyimide, said etching step including the steps of:

purging the etchable material with N_2 gas;

pretreating the etchable material with N_2 gas and vapor H_2O ; and

exposing the etchable material to a combination of N_2 gas, vapor H_2O and vapor hydrogen fluoride; and

removing said layer of polyimide.

17. The method of claim 16 wherein said removing step comprises the step of subjecting said layer of polyimide to QZ 3321 polyimide stripper.

18. The method of claim 16 wherein said exposing step uses a quantity ratio of said N_2 gas to vapor H_2O to vapor hydrogen fluoride of approximately 150 to 30 to 7, respectively.

19. The method of claim 18 wherein said pretreating step uses a quantity ratio of said N_2 gas to vapor H_2O of approximately 5 to 1, respectively.

20. The method of claim 19 wherein said vapor hydrogen fluoride flows during said exposing step at about 350 standard cubic centimeters per minute.

21. A method of producing a micropoint of a field emission device, the method comprising the steps of:

forming a micropoint on a baseplate;

forming a dielectric layer on said baseplate, said dielectric layer covering said micropoint and being fabricated from an etchable material;

forming a covering layer on said dielectric layer, said covering layer being fabricated from an etch resistant material;

planarizing portions of said dielectric and covering layers so as to expose a portion of the dielectric layer over said micropoint;

etching said dielectric layer using vapor hydrogen fluoride to remove portions of said dielectric layer covering said micropoint thereby forming a cavity around said micropoint.

22. A method according to claim 21, further including forming an etch resistant masking layer over selected portions of said field emission device.

23. A method according to claim 22, wherein said masking layer comprises polyimide.

24. A method according to claim 23, wherein step of forming an etch resistant masking layer comprises forming said masking layer over portions of said field emission device displaced from said cavity.

25. A method according to claim 21, further including a step of forming a passivation layer over said covering layer.

26. A method according to claim 25, wherein said etching step further comprises removing selected portions of said passivation layer.